Claims:

1. A method of modifying a nucleic acid molecule comprising;

contacting the nucleic acid molecule with a prokaryotic DNA repair ligase polypeptide.

2. A method according to claim 1 wherein the prokaryotic DNA repair ligase polypeptide comprises one or more of: a primase domain, a nuclease domain, and a ligase domain, said one or more domains sharing greater than 20% sequence identity with the corresponding domain sequence of Mt-Lig (CAB08492).

3. A method according to claim 1 or claim 2 wherein the prokaryotic DNA repair ligase polypeptide shares greater than 20% sequence identity with the sequence of Mt-Lig (CAB08492).

4. A method according to any one of claims 1 to 3 wherein the prokaryotic DNA repair ligase polypeptide is Mt-Lig (CAB08492) or a variant or allele thereof.

5. A method according to any one of the preceding claims wherein the nucleic acid molecule and the Mt-Lig polypeptide are contacted in the presence of a prokaryotic Ku polypeptide.

6. A method according to claim 5 wherein the prokaryotic Ku polypeptide shares greater than 20% sequence identity with the sequence of Mt-Ku (CAB08491).

7. A method according to claim 6 wherein the prokaryotic Ku polypeptide is Mt-Ku (CAB08491) or an allele or variant thereof.

8. A method of ligating nucleic acid molecule ends comprising;

contacting a first nucleic acid end and a second nucleic acid end with an prokaryotic DNA repair ligase polypeptide,

wherein said first and said second nucleic acid ends are non-compatible.

9. A method according to claim 8 wherein said first and said second nucleic acid ends comprise non-complementary overhang regions.

10. A method according to claim 8 or claim 9 wherein the first end is on a first nucleic acid molecule and the second end is on a second nucleic acid molecule.

11. A method according to claim 10 wherein the first and second nucleic acid molecules are DNA.

12. A method according to claim 10 wherein the first nucleic acid molecule is DNA and the second nucleic acid molecule is RNA.

13. A method according to claim 8 or claim 9 wherein the first and second ends are on the same nucleic acid molecule.

14. A method according to any one of claims 8 to 13 comprising isolating and/or purifying the ligated nucleic acid molecule.

15. A method of labelling a nucleic acid molecule comprising;

contacting a nucleic molecule having a first terminus with an prokaryotic DNA repair ligase polypeptide in the presence of labelled nucleotides.

16. A method according to claim 15 wherein the nucleotides are NTPs.

17. A method according to claim 15 wherein the nucleotides are dNTPs.

18. A method of filling in a single stranded gap in a double stranded nucleic acid molecule comprising;

contacting a double stranded nucleic acid molecule having a single stranded region with an prokaryotic DNA repair ligase polypeptide.

19. A method according to claim 18 wherein said nucleic acid molecule and said prokaryotic DNA repair ligase polypeptide are contacted in the presence of NTPs.

20. A method according to claim 18 wherein said nucleic acid molecule and said prokaryotic DNA repair ligase polypeptide are contacted in the presence of dNTPs.

21. A method of removing a single stranded overhang from the end of a nucleic acid molecule comprising;
contacting said nucleic acid molecule with a prokaryotic DNA repair ligase polypeptide

22. A method according to claim 21 wherein the prokaryotic DNA repair ligase polypeptide is an Mt-Lig polypeptide.

23. A method according to claim 21 or claim 22 wherein said nucleic acid molecule is contacted in the presence of Mg^{2+} or Mn^{2+}.

24. A method of producing an RNA molecule comprising;
contacting a prokaryotic DNA repair ligase polypeptide and a template DNA strand in the presence of NTPs.

25. A method according to claim 24 wherein prokaryotic DNA repair ligase and template DNA are contacted in the presence of a primer oligonucleotide.

26. A method of producing an DNA molecule comprising;
contacting A prokaryotic DNA repair ligase polypeptide and a nucleic acid template in the presence of dNTPs and a primer oligonucleotide.

27. A method according to claim 26 wherein the nucleic acid template is an RNA template.

29. A method according to any one of claims 8 to 28 wherein the prokaryotic DNA repair ligase polypeptide comprises one or more of: a primase domain, a nuclease domain, and a ligase domain, said one or more domains sharing greater than 20% sequence identity with the corresponding domain sequence of Mt-Lig (CAB08492).

30. A method according to any one of claims 8 to 29 wherein the prokaryotic DNA repair ligase polypeptide shares greater than 20% sequence identity with the sequence of Mt-Lig (CAB08492).

31. A method according to any one of claims 8 to 30 wherein the prokaryotic DNA repair ligase polypeptide is Mt-Lig (CAB08492) or a variant or allele thereof.

32. A method according to any one of claims 8 to 31 wherein the nucleic acid molecule and the Mt-Lig polypeptide are contacted in the presence of a prokaryotic Ku polypeptide.

33. A method according to claim 32 wherein the prokaryotic Ku polypeptide shares greater than 20% sequence identity with the sequence of Mt-Ku (CAB08491).

34. A method according to claim 32 or claim 33 wherein the prokaryotic Ku polypeptide is Mt-Ku (CAB08491) or an allele or variant thereof.

35. A kit comprising an isolated Mt-Lig polypeptide for use in a method according to any one of claims 1 to 34.

36. A kit according to claim 35 comprising an isolated Mt-Ku polypeptide.

37. A kit according to claim 35 or claim 36 comprising dNTPs.

38. A kit according to claim 35 or claim 36 comprising NTPs.

39. A kit according to any one of claims 35 to 38 comprising one or more of buffers, stabilisers and excipients.

40. A method of producing an prokaryotic DNA repair polypeptide comprising;

(a) causing expression from nucleic acid which encodes a prokaryotic DNA repair polypeptide in a suitable expression system to produce the polypeptide recombinantly; and,

testing the recombinantly produced polypeptide for prokaryotic DNA repair activity.

41. A method according to claim 40 wherein the recombinantly produced polypeptide is tested for one or more of: non-complementary end ligation activity, DNA dependent RNA primase activity, 3′-5′ exonuclease activity, DNA and RNA dependent DNA polymerase activity, DNA dependent RNA polymerase activity, ATP dependent DNA and RNA ligase activity and DNA terminal transferase activity.

42. A method according to claim 39 or 40 wherein the prokaryotic DNA repair polypeptide is an Mt-Lig polypeptide or an allele or variant thereof.

43. A method according to any one of claims 39 to 41 comprising purifying said recombinantly produced polypeptide.